

PSYC 5311 Biopsychology



INSTRUCTOR

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EMAIL

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OFFICE LOCATION

Science and Technology 249D

OFFICE HOURS

W 1:30-2, R 12-2

or by appointment.

Virtual meetings available

COURSE OVERVIEW

Biopsychology asks how the machinery of the nervous system produces behavior, and how we answer those questions experimentally with confidence. We move from the single cell to a wide range of behaviors, including clinical disorders, across fifteen weekly modules. Two ideas run through all of them. First, behavior has four kinds of explanation: mechanism, development, evolutionary history, and function. An account that answers only one is not finished. Second, the brain is a prediction machine: perception, reward, body ownership, and hallucination all make more sense as inference over noisy evidence.

We will spend more time on fewer things. Rather than survey every system, we will focus on deeper exploration of episodes where the field argued with itself and sometimes got it wrong: Lashley's search for the engram, McConnell's planaria, the serotonin theory of depression, the fabricated Alzheimer's images, and more. Each carries a methodological lesson. By the end you should be able to read an unfamiliar paper and say not only what it found, but what its methods entitle it to claim.

REQUIRED TEXTS: There is no textbook. All readings are curated primary sources such as empirical articles and theoretical reviews posted to Blackboard. Free background reading: the open textbook *Introduction to Neuroscience* (Michigan State University).

COURSE GOALS AND OBJECTIVES

As a result of successfully completing this course, the student will be able to:

- **Explain mechanism across scales:** Trace a behavior from gene to protein to cell to circuit to output, identifying the major cell types and modes of signaling in the nervous system.
- **Build a molecular phylogeny:** Construct and interpret a phylogenetic tree from receptor protein sequence data.
- **Predict from mechanism:** Make evidence-based predictions about novel behaviors by integrating neuroanatomical and pharmacological evidence.
- **Evaluate methods:** Judge what a technique (lesion, inactivation, optogenetics, imaging, recording) entitles a researcher to claim, and recognize when a literature has outrun its evidence.
- **Advocate from evidence:** Argue a public policy position grounded in the mechanisms of behavior.
- **Teach a mechanism:** Explain a biopsychological mechanism accurately to an audience that does not share your training.

GRADING

Types of Assignments

- (50%) Unit Exams. Three exams, proctored at the Testing Center and taken outside class time within a stated window. Exams 1 and 2 are worth 15 points each; Exam 3 is worth 20 because it also asks questions that reach across the whole course. Mixed multiple choice and short essay, drawn from class sessions, the assigned readings, and your classmates' videos.
- (30%) Assignments. Five assignments, 6 points each. Each one asks you to put several pieces of evidence together and make something: a phylogenetic tree built from a receptor gene sequence using BLAST, a position paper on what attention is and what its mechanisms imply for disorder, a public-facing video teaching one cognition or language mechanism, an original analogy for neural oscillation and cross-area synchrony, and a two-page policy brief to a state legislator.
- (10%) Journal Club. Each week one or two of you lead discussion of that week's anchor paper: what question it asked, what its methods entitle it to claim, and where you would push on it. Everyone leads at least once. Six points for your own lead and four for participation across the semester. Come having read the paper — that is the whole cost of admission.
- (10%) Reflections. Five short pieces, 2 points each. Two are guided explorations; three ask you to write your own exam questions with real answer keys. These are not busywork: I pull actual exam items out of them. In the last version of this course, five of the ten questions on the final unit exam were written by students in the class. If I select yours it goes on the exam, I credit you when I post the review set, and you earn one bonus point on that exam.

All assignments will be submitted through blackboard, and instructions/rubrics will be available on blackboard unless otherwise noted. Your final grade in this class will be calculated as a simple average: your points earned divided by the maximum number of points you could have earned. The total points for the course is 100. You can take your final total and calculate the percentage and letter grade based on the usual cutoffs (90 = A, 80 = B, 70 = C, 60 = D, 59 or lower = F).

LATE WORK

Due dates and times are clearly listed on every assignment. In general, work for the week is due by class time on Monday of the following week. Work turned in after the due date and time is considered late and will not be accepted. If you have an emergency situation, notify me ASAP for consideration, and include any necessary documentation. Accommodations under the university's religious observance and pregnant/parenting policies listed below are not late work: notify me in advance and we will agree on an alternate date.

WITHDRAWAL POLICY

Any withdrawals after the last day for an automatic "W" date established by the university will receive the grade of "F".

CONDENSED COURSE SCHEDULE (FULL VERSION ON BLACKBOARD)

Unit 1 — Foundations: Cells, Signals, and the Shape of an Explanation

Week 1 (Aug 24 & 26): What Is Biopsychology? Evolution and Levels of Analysis

Through-line: Four kinds of explanation, not one. Tinbergen, selection by consequences, and the origin of neurons.

Week 2 (Aug 31 & Sep 2): Neurons and Other Cells

Through-line: Gene to protein to ion channel. Glia stop being scenery.

Week 3 (Sep 9 only — Labor Day Sep 7): Methods Alignment and the Predictive Brain

Through-line: What each technique entitles you to claim, and prediction error as the frame we will use all semester.

Week 4 (Sep 14 & 16): Brain Evolution and Neuroanatomy

Through-line: Development, cladistics, hormones, and sexual differentiation. When "where" is the interesting question and when it is not.

Week 5 (Sep 21 & 23): Neurotransmitters and Receptors

Method lesson: How a field held the serotonin theory of depression for decades with very little underneath it.

Unit 2 — Sensing, Representing, Remembering, Valuing

Week 6 (Sep 28 & 30): Vision

Through-line: Transduction, receptive fields, and hallucination as an over-weighted prior.

Week 7 (Oct 5 & 7): Audition, Chemical Senses, and Body Representation

Through-line: Olfaction as the payoff on GPCR signaling. The rubber hand, the phantom limb, and Bayesian ownership.

Week 8 (Oct 12 & 14): Perception and Attention

Method lesson: Construct validity. Is attention a thing at all?

Week 9 (Oct 19 & 21): The Engram — and Sleep

Method lesson: What a lesion licenses, and what cannot be blinded. Lashley, McConnell, Hebb, and consolidation during sleep.

Week 10 (Oct 26 & 28): Reward, Punishment, and Motivated Behavior

Through-line: Dopamine as prediction error. Homeostatic versus hedonic feeding. Parkinson's disease and L-DOPA.

Week 11 (Nov 2 & 4): Brain Injury and Recovery

Through-line: What actually recovers, and what only appears to.

Unit 3 — Higher Function, and What Happens When It Breaks

Week 12 (Nov 9 & 11): Cognition and Language

You teach this one: video showcase Monday, then lateralization, aphasia, and the split brain on Wednesday.

Week 13 (Nov 16 & 18): Emotion and Stress

Method lesson: Which way the causal arrow runs. Oscillations, the HPA axis, oxytocin, and empathy.

Week 14 (Nov 23 only — Study Day Nov 25): Drugs and Addiction

Through-line: Tolerance as receptor trafficking. Addiction as a disorder of learning and memory. Thanksgiving holiday Nov 26–28.

Week 15 (Nov 30 & Dec 2): Clinical Disorders

Method lesson: Research integrity and the fabricated Alzheimer's images. Do our diagnostic categories carve the brain at its joints?

Finals

Finals Week (Dec 5–11): Exam 3 at the Testing Center. Last class day is Friday, Dec 4.

The full calendar with all readings, journal club papers, and due dates is posted separately on Blackboard.

TIME COMMITMENT

Federal law mandates that each "hour" of course credit requires two hours outside of class. As such, we expect you to spend time outside of class studying (even if we don't assign any homework)! You will be tempted to make that time as close to zero as possible. This is a big trap that you *must* avoid. A full-time student (12+ hours of class) is a full-time job, and expect to spend at least 36+ hours a week.

QUALITY OF WRITTEN WORK

All written work should be academic quality submitted in APA format in order to expect full credit.

INTELLECTUAL PROPERTY

We are both going to make things this semester, and both of us have a stake in what happens to them. Most courses leave this unsaid. I would rather write it down, because the arrangement is genuinely mutual and it reads better in the open.

- My materials. Slides, lecture notes, assignments, exam questions, course pages, and anything else I make for this class are mine. Use them freely for your own learning — download them, mark them up, keep them after the course ends. What I ask is that they not be redistributed: not uploaded to Chegg, Course Hero, Quizlet, or a shared drive, and not handed along to a future section. Exam questions that circulate stop measuring anything which costs me the time I would rather spend making the course better. And some of what I make here is creative work — the occasional song about planarian cannibalism, for instance — which I would like to remain mine to share or not.
- Your work. Your papers, videos, policy briefs, analogies, and exam questions are yours, and you hold the copyright. I will not sell your work, publish it, or use it for any commercial purpose. I will not put it in a portfolio, a promotional piece, or a future course without asking you first and hearing yes.
- The one exception, stated up front. Teaching has its own scholarly literature, and I occasionally write for it. If I ever quote student work in a pedagogy or scholarship-of-teaching publication, the quotation will be brief, anonymous, and stripped of identifying detail. For anything more than that I will ask — and “no” is a complete answer that will not affect your grade or how I work with you.
- What this does not do. None of this restricts you. Your work is yours to post, publish, submit to a conference, build a thesis chapter on, or show a hiring committee. Several assignments here are built to outlive the semester: the policy brief and the teaching video in particular are meant to be things you can hand to someone.

This is my understanding of how it generally works, not a take-it-or-leave-it. If you have reason to want different terms — an agreement with a lab, a funder's requirements, work you would rather keep out of a classroom, or simply a different view of it — come talk to me and we will put something else in writing for your situation.

AI POLICY: BROADER USE OF GENERATIVE AI PERMITTED WITHIN GUIDELINES

Use of artificial intelligence (AI) tools, including ChatGPT, is permitted in this course for students who wish to use them. To adhere to our scholarly values, students must cite any AI-generated material that informed their work (this includes in-text citations and/or use of quotations, and in your reference list). Using an AI tool to generate content without proper attribution qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.



IMPORTANT POLICIES AND RESOURCES

University Email Policy and Course Communications: All correspondence between professors and students must occur via university email accounts. You must have your Jaguar email account ready and working. If it is not working, contact the help desk at helpdesk@tamusa.edu or at 210-784-HELP (4357). If you don't hear back within 48 hours, contact them again. They have many requests during the first part of the semester, so you may need to follow up with them.

Academic Accommodations for Individuals with Disabilities: Texas A&M University-San Antonio is committed to providing all students with reasonable access to learning opportunities and accommodations in accordance with The Americans with

Disabilities Act, as amended, and Section 504 of the Rehabilitation Act. If you experience barriers to your education due to a disability or think you may have a disability, Disability Support Services is located in the Central Academic Building, Suite 210. You can also contact us via phone at (210) 784-1335, visit us at the [Disability Support Services website](#) or email us at dss@tamusa.edu. All students are encouraged to discuss their academic accommodation with Disability Support Services and their instructors as soon as possible.

Academic Learning Center: All currently enrolled students at Texas A&M University-San Antonio can utilize the Academic Learning Center for subject-area tutoring. The Academic Learning Center provides free course-based tutoring to all currently enrolled students at Texas A&M University-San Antonio. Students wishing to work with a tutor can make appointments through the Brainfuse online tutoring platform. Brainfuse can be accessed in the *Tools* section of Blackboard. You can contact the Academic Learning Center by emailing tutoring@tamusa.edu, calling (210) 784-1307, or visiting the Central Academic Building, room 202. Online tutoring is also available for after hours and weekend assistance.

While tutoring hours may change based on tutor schedules and availability, the current tutoring hours for MATH in the ALC are as follows:

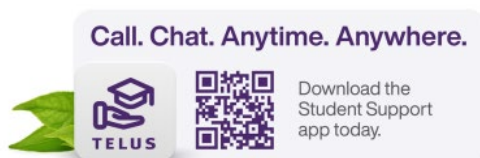
Appointments available M-F 8-6

Walk in Tutoring – No appointment needed M-F 9-5

Counseling/Mental Health Resources: As a college student, there may be times when personal stressors interfere with your academic performance and negatively impact your daily functioning. If you are experiencing emotional difficulties or mental health concerns, support is available to you through the Student Counseling Center (SCC). To schedule an appointment, visit our website, call 210-784-1331 or visit Madla 120 between the hours of 8:00 AM and 5:00 PM.

All mental health services provided by the SCC are free and confidential (as the law allows). The Student Counseling Center provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services. *Crisis support is available 24/7/365 by calling the SCC at 210-784-1331 or through the TELUS student support App.*

The TELUS Student Support App provides a variety of mental health resources to including 24/7/365 support for in the moment distress, crisis support, an anonymous peer-to-peer support network, mental health screenings, podcasts, and articles to improve your mental wellbeing.



Emergency Preparedness: JagE Alert is Texas A&M University-San Antonio's mass notification system. In the event of an emergency, such as inclement weather, students, staff and faculty, who are registered, will have the option to receive a text message, email with instructions and updates. To register or update your information visit: <https://tamusa.bbcportal.com/>. More information on emergency response may be found at: [Emergency Operations Plan](#) and the [Emergency Action Plan](#). Download the SafeZone App (<https://safezoneapp.com/>) for emergencies or call (210) 784-1911. Non-Emergency (210) 784-1900.

Financial Aid and Verification of Attendance: According to the following federal regulation, 34 CFR 668.21: U.S. Department of Education (DoE) Title IV regulation, a student can only receive Title IV funds based on Title IV eligibility criteria which include class attendance. If Title IV funds are disbursed to ineligible students (including students who fail to begin attendance), the institution must return these funds to the U.S. DoE within 30 days of becoming aware that the student will not or has not begun attendance. Faculty will provide the Office of Financial Aid with an electronic notification if a

student has not attended by the published Census Date (the first week of class). Any student receiving federal financial aid who does not attend prior to the published Census Date (the first week of class) will have their aid terminated and returned to the DoE. Please note that any student who stops attending at any time during the semester may also need to return a portion of their federal aid.

Jaguar Writing, Language, and Digital Composing Center (WLDCC): The WLDCC provides support to graduate and undergraduate students in all three colleges as well as faculty and staff. Writing tutors work with students to develop reading skills, prepare oral presentations, and plan, draft, and revise their written assignments. Our language tutors support students enrolled in Spanish courses and students composing in Spanish for any assignment. Our digital studio tutors support students working on digital projects such as eportfolios, class presentations, or other digital multimedia projects. The WLDCC offers face-to-face, synchronous online, and asynchronous digital appointments. Students can schedule appointments with the WLDCC in JagWire under the Student Services tab. Click on "Writing, Language, and Digital Composing Center" to make your appointment. Students wanting to work in realtime with a tutor can schedule an "Online Appointment." Students wishing to receive asynchronous, written feedback from a tutor can schedule an "eTutoring" appointment. More information about what services we offer, how to make an appointment, and how to access your appointment can be found on our [WLDCC website](#) . The WLDCC can also be reached by emailing wldcc@tamusa.edu.

Meeting Basic Needs: Any student who has difficulty affording groceries or accessing sufficient food to eat every day or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to submit a [CARE report](#) for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable them to direct you to available resources. A food pantry is available on campus; see the [General's Store page](#) for hours and contact information.

Military Affairs: Veterans and active-duty military personnel are welcomed and encouraged to visit the Office of Military Affairs for any question involving federal or state VA Education Benefits. Visit the Patriots' Casa building, room 202, or to contact the Office of Military Affairs with any questions at military.va@tamusa.edu or (210)784-1397.

Religious Observances: Texas A&M University-San Antonio recognizes the wide variety of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or course work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes.

The Six-Drop Rule: Students are subject to the requirements of Senate Bill (SB) 1231 passed by the Texas Legislature in 2007. SB 1231 limits students to a maximum of six (6) non-punitive course drops (i.e., courses a student chooses to drop) during their undergraduate careers. A non-punitive drop does not affect the student's GPA. However, course drops that exceed the maximum allowed by SB 1231 will be treated as "F" grades and will impact the student's GPA.

Statement of Harassment and Discrimination: Texas A&M University-San Antonio is committed to the fundamental principles of academic freedom, equal opportunity, and human dignity. To fulfill its multiple missions as an institution of higher learning, A&M-San Antonio encourages a climate that values and nurtures collegiality and the uniqueness of the individual on our campus and within our state, nation, and world. All decisions and actions involving students and employees are to be based on applicable law and individual merit. Texas A&M University-San Antonio, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, or pregnancy/parenting status. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the University's Civil Rights Officer at 210-784-2061 or titleix@tamusa.edu.

Texas A&M University-San Antonio faculty are committed to providing a safe learning environment for all students and for the university as a whole. If you have experienced any form of sex discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking based on sex, know that help and support are available. A&M-San Antonio's Title IX Coordinator can support those impacted by such conduct in navigating campus life, accessing health

and counseling services, providing academic and housing accommodations, and more. The university strongly encourages all students to report any such incidents to the Title IX Coordinator. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and trained victim advocates) are required to report information about such discrimination and harassment to the university. This means that if you tell a faculty member about a situation of sexual harassment, sexual violence, or other related sex-based misconduct, the faculty member must share that information with the university's Title IX Coordinator (titleix@tamusa.edu, 210-784-2061, CAB 439K). If you wish to speak to a confidential employee who does not have this reporting requirement, you can contact the Student Counseling Center at (210) 784-1331 or visit them in Madla 120.

Pregnant/Parenting Students: Texas A&M-San Antonio does not require a pregnant or parenting student, solely because of that status or issues related to that status, to (1) take a leave of absence or withdraw from their degree or certificate program; (2) limit the student's studies; (3) participate in an alternative program; (4) change the student's major, degree, or certificate program; or (5) refrain from joining or cease participating in any course, activity, or program at the University. The university will provide such reasonable accommodations to pregnant students as would be provided to a student with a temporary medical condition that are related to the health and safety of the student and the student's unborn child. These could include maintaining a safe distance from substances, areas, and activities known to be hazardous to pregnant individuals and their unborn child; excused absences because of illness or medical appointments; modified due dates for assignments; rescheduled tests/exams; taking a leave of absence; and being provided access to instructional materials and video recordings of lectures for excused absences, if these would be provided to any other student with an excused absence. Pregnant/parenting students are encouraged to contact the Title IX Coordinator with any questions or concerns related to their status (titleix@tamusa.edu; 210-784-2061; CAB 439K).

Texas A&M-San Antonio has also designated the Title IX Coordinator as the liaison officer for current or incoming students who are the parent or guardian of a child younger than 18 years of age. The Title IX Coordinator can provide students with information regarding support services and other resources.

Young Jaguars can support parenting students with daycare if students meet this criteria: (1) must be enrolled in classes at Texas A&M-San Antonio in the current semester, (2) must be Pell eligible or a single parent, (3) child(ren) must be aged 3 to 12-years-old, and (4) child(ren) must be enrolled in Pre-K-3 through 6th grade. Hours of operation is Monday-Thursday 3:30pm-9:00pm. For more information, please contact Young Jaguars at youngjaguars@tamusa.edu or call (210) 784-2636.

Students' Rights and Responsibilities: The following statement of students' rights and responsibilities is intended to reflect the philosophical base upon which University Student Rules are built. This philosophy acknowledges the existence of both rights and responsibilities, which is inherent to an individual not only as a student at Texas A&M University-San Antonio but also as a citizen of this country.

Students' Rights

1. A student shall have the right to participate in a free exchange of ideas, and there shall be no University rule or administrative rule that in any way abridges the rights of freedom of speech, expression, petition and peaceful assembly as set forth in the U.S. Constitution.
2. Each student shall have the right to participate in all areas and activities of the University, free from any form of discrimination, including harassment, on the basis of race, color, national or ethnic origin, religion, sex, disability, age, and pregnancy/parenting or veteran status in accordance with applicable federal and state laws.
3. A student has the right to personal privacy except as otherwise provided by law, and this will be observed by students and University authorities alike.
4. Each student subject to disciplinary action arising from violations of university student rules shall be assured a

fundamentally fair process.

Students' Responsibilities

1. A student has the responsibility to respect the rights and property of others, including other students, the faculty, and administration.
2. A student has the responsibility to be fully acquainted with the published University Student Rules found in the Student Handbook, [Student Code of Conduct](#), on our website, and University Catalog, and to comply with them, as well as with federal, state, and local laws.
3. A student has the responsibility to recognize that student actions reflect upon the individuals involved and upon the entire University community.
4. A student has the responsibility to recognize the University's obligation to provide a safe environment for learning.
5. A student has the responsibility to check their university email for any updates or official university notifications.

We expect that students will behave in a manner that is dignified, respectful, and courteous to all people, regardless of sex, ethnic/racial origin, religious background, or disability. Conduct that infringes on the rights of another individual will not be tolerated.

Students are expected to exhibit a high level of honesty and integrity in their pursuit of higher education. Students engaging in an act that violates the standards of academic integrity will find themselves facing academic and/or disciplinary sanctions. Academic misconduct is any act, or attempt, which gives an unfair advantage to the student. Additionally, any behavior specifically prohibited by a faculty member in the course syllabus or class discussion may be considered as academic misconduct. For more information on academic misconduct policies and procedures please review the [Student Code of Conduct](#) or visit the resources available in the [OSRR website](#)